Jan. 6. 1925. 1,521,762

C. W. DUCKWORTH

VAPORIZER

Filed Sept. 4, 1923

Fig 1

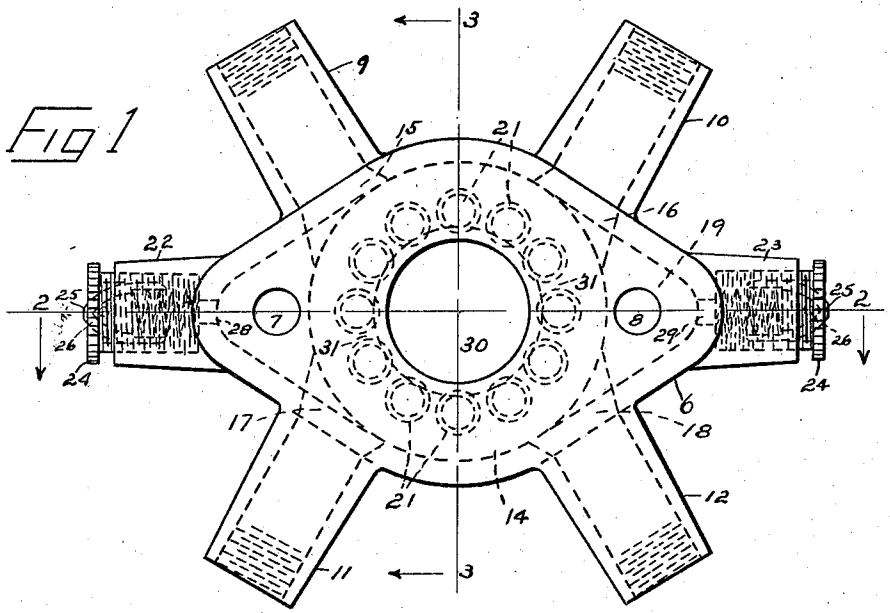


Fig 2

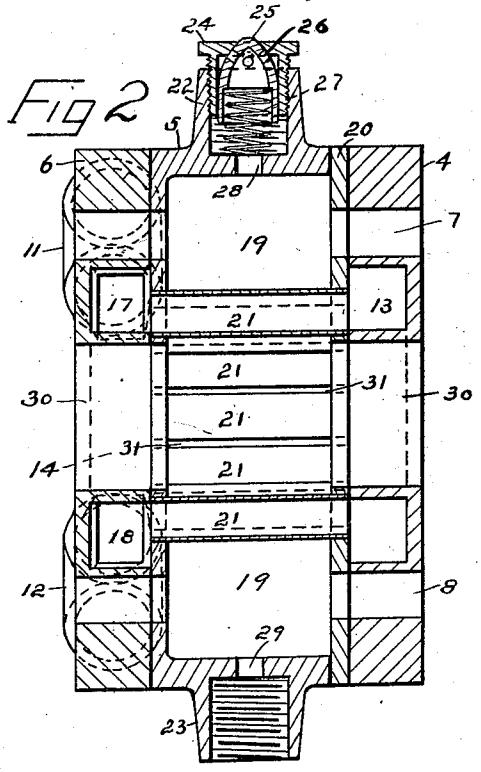
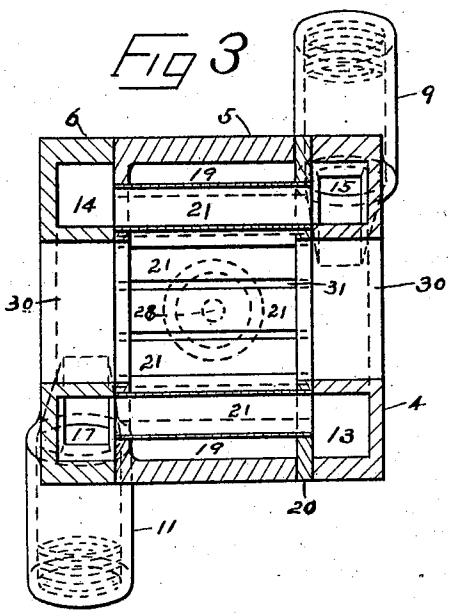


Fig 3



Charles W. Duckworth,
Inventor.
by Henrik J. Schmidt
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Patented Jan. 6, 1925. 1,521,762

UNITED STATES PATENT OFFICE.

CHARLES W. DUCKWORTH, OF JACKSONVILLE, FLORIDA.

VAPORIZER.

Application filed September 4, 1923. Serial No. 660,768.

To all whom it may concern:

Be it known that I, CHARLES W. DUCKWORTH, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented certain new and useful Improvements in Vaporizers, of which the following is a specification.

My invention relates to vaporizers of the class used for vaporizing the fuels used in internal combustion engines. The main and particular objects and advantages of the invention are: to provide a vaporizer in which the fuel, as it passes through it to the engine, is vaporized by the heat given off by the exhaust from the engine; to provide automatic means for adding additional, heated air to the fuel; and to provide means for thoroughly mixing this added air with the fuel.

A further object is to provide a vaporizer completely automatic in its operation, simple and strong in construction, small in size, easy to attach to any engine, and comparatively inexpensive to manufacture.

These and various other objects and advantages will be clearly understood from the following specification and from the accompanying drawing of a preferred embodiment of my invention, but it will be understood that modifications might be made without departing from the scope of the invention.

Fig. 1 is a side elevation of a preferred embodiment of the vaporizer.

Fig. 2 is a cross-sectional top view of Fig. 1, taken on the line 2—2.

Fig. 3 is a cross-sectional side view of Fig. 1, taken on the line 3—3.

In the description which follows, the operation of the vaporizer has been explained in connection with a gasoline, automobile engine to facilitate the description, but it will be understood that I do not wish to limit the use of the invention to such engines only.

In a general way the vaporizer may be described as a device placed between the carburetor and the engine, the air and gasoline after being mixed in the carburetor pass through the vaporizer where it is heated by coming in contact with a plurality of tubes through which exhaust from the engine flows. Additional air, also heated by these tubes, is, when needed, automatically drawn into the vaporizer and mixed with the heated mixture before this enters the engine.

Referring now to all the views, the vaporizer consists of an entrance part 4, an inner part 5 and an exhaust part 6. All these parts are similar in shape and size to the boss on the engine and are bolted between the carburetor and the engine by means of cap screws passing through the holes 7 and 8. As these holes align with the holes in the carburetor and engine, no drilling or tapping in either of these is necessary.

The entrance part 4 and the exhaust part 6 are alike but turned in opposite directions; each is provided with two internally threaded branches 9, 10 and 11, 12 respectively. These branches communicate with annular recesses 13 and 14 by means of the rectangular openings 15, 16, 17 and 18.

The inner part 5 is provided with a recess which is of the same outline as the part itself. A cover 20, also of the same shape as part 5, fits over the recess 19. The holes 7 and 8 are also drilled through this cover. A plurality of tubes 21 are radially located in the recess 19, these tubes are securely riveted in the part 5 and the cover 20, as plainly shown on the drawing, and form the means of communication between the annular recesses 13 and 14.

The inner part 5 is also provided with two internally threaded branches 22 and 23 in which adjustable, suction, air valves are located. These air valves, of which one is plainly shown in cross-section on Fig. 2, consist of an externally threaded valve bushing 24, a pointed, hollow, cylindrical valve 25 provided with a plurality of holes 26, and a spring 27 which tend to hold the valve in its closed position. The valve is guided in the bushing and the spring in the valve, as plainly shown. Openings 28 and 29 communicate with the recess 19.

A circular opening 30 aligns with the openings in the engine and carburetor and the tubes 21 are so located that they form a continuation of this opening, however, the tubes are slightly separated so that spaces 31 are formed between them.

The vaporizer operates in the following manner: Part of the exhaust from the engine is led to the branches 9 and 10 by means of suitable piping. This exhaust after flowing through these branches enters the recess 13 through the openings 15 and

16 and then flows through the tubes 21. As these tubes are made from thin metal they are heated by the exhaust. From the tubes the exhaust enters the recess 17, from which it is expelled through the openings 17 and 18 and branches 11 and 12. Suitable piping, fitted in the branches 11 and 12, is used to lead the used exhaust to such place where it is desired to exhaust it.

The mixture of gasoline and air after leaving the carburetor flows through the central opening 30 and as it comes in contact with the heated tubes 21 is heated and vaporized by these and by the heat given off from these. As the speed of the vaporized mixture increases the suction created causes the valves 25 to open and air to flow in through the holes 26 and thus through the center of the valve 25 and openings 28 and 29 into the recess 19. This air as it flows towards the center opening 30 is also heated by the tubes 21 and by being forced to pass through the passages 31, between the tubes 21, is thoroughly mixed with the mixture flowing through the center opening. The valves operate automatically with relation to the flow in the center opening and is governed by this flow.

Having described my invention and its operation, what I claim as new and wish to protect by Letters Patent is:

1. In a vaporizer, of the class described; an entrance part having a circular recess and two inlets communicating with said recess; an inner part having an elliptical recess; a cover fitting over said elliptical recess; a plurality of tubes secured between said inner part and said cover within said inner part recess and communicating with the recess in the entrance part; an exhaust part having a circular recess communicating with the said tubes and two outlets from said elliptical recess; the said entrance part, inner part, cover, and exhaust part all made of the same outline as the flange on the engine to which the vaporizer is attached; bolt holes, for attaching the vaporizer, passing through all of said parts; a central fuel passage through all of said parts; the aforementioned tubes secured in the innerpart recess forming an annular ring around said fuel passage and so spaced that the fuel can pass between and around them; and means provided for automatically supplying additional air to the said fuel.

2. In a vaporizer, of the class described, an entrance part having a circular recess and two inlets communicating with said recess; an inner part having an elliptical recess; a cover fitting over said elliptical recess; a plurality of tubes secured between said inner part and said cover within said inner part recess and communicating with the recess in the entrance part; an exhaust part having a circular recess communicating with the said tubes and two outlets from said elliptical recess; the said entrance part, inner part cover, and exhaust part all made of the same outline as the flange on the engine to which the vaporizer is attached; bolt holes, for attaching the vaporizer, passing through all of said parts; a central fuel passage through all of said parts; the aforementioned tubes secured in the inner part recess forming an annular ring around said fuel passage and so spaced that the fuel can pass between and around them; two air inlets provided in the said inner part; spring actuated, hollow, conical pointed valves, having a plurality of orifices near their pointed ends, operating in said air inlets; and screw adjustable valve seats, against which said valves close, attached in said air inlets.

In testimony whereof I, CHARLES W. DUCKWORTH have signed my name to this specification in the presence of two subscribing witnesses, this 10th day of Oct. 1922.

CHARLES W. DUCKWORTH.

Witnesses:
HENRIK J. SCHMIDT,
VIOLET WALKER.